conditions existed at the time of the outbreak in 1884, that were observed to be present during the outbreak in 1881, but although these circumstances are probably sufficient to account for the dissemination of the disease-particles, Mr. Power points out that some other factor is wanting to produce disease, for the same atmospheric conditions subsequently existed during a time of hospital activity without any resulting outburst.

VACCINATION.

The first volume of *Arbeiten aus dem Kaiserlichen Gesundheitsamte*, in Berlin, contains the results of vaccination in the German Empire in 1882. The population of that year comprised 1,459,377 children, or 3.70 per cent. of the total population, of an age to be primarily vaccinated; but of these, 681 had previously had smallpox, and 120,232 had already been successfully vaccinated, leaving 1,338,464 children requiring operation. Of these 1,158,696 were successfully vaccinated, or 95.98 per cent.; 31,441 without result, or 2.35 per cent., and in 5773 the results were unknown. Thus of the total number, 142,507 remained unvaccinated. The reason of the increase of unsuccessful vaccinations was due to the vaccinations in the Grand Duchy of Hesse, where, owing to the introduction of animal lymph, the number of successful vaccinations decreased from 97.31 per cent. in 1881, to 63.44 per cent. in 1882. Thus, if the results in Hesse be omitted, the children in the other States who were successfully vaccinated amount to 97.48 per cent. of the total vaccinations.

It is instructive to find this statement in an official report of the German Empire following in but a few weeks the publication of conclusions of the German Commission on Vaccination, which are as follows:

For vaccination with humanized lymph may be mentioned the certainty of its action, the simplicity of its machinery, the inexpensive manipulation of the lymph.

Against it are urged the known dangers of vaccino-syphilis and erysipelas, the possibility of the conveyance of tuberculosis, and the difficulties which arise in the manipulation of the lymph.

For the use of animal lymph, there are urged the security against vaccino-syphilis, the advantages of a quantity of lymph produced at the same time, the possibility of manipulating lymph antiseptically, and thus a greater safeguard against erysipelas.

Against it, may be taken the less certainty in its results, a more complicated machinery, and the greater cost of production of lymph.

On the whole, however, it must be acknowledged that the advantages of animal lymph outweigh the disadvantages connected with its use, and that it is capable of supplying the place of humanized lymph.

In conclusion, the chief reasons for this decision may be stated as follows:

Compulsory vaccination can only be maintained if injuries to health and life through vaccination, and especially vaccino-syphilis, can be prevented.

This condition cannot be fulfilled by vaccination with humanized lymph.

Vaccination with animal lymph, which in recent times has more nearly approached the use of humanized lymph in its certainty of result, excludes all possibility of syphilis, and offers greater security than humanized lymph against other diseases, such as erysipelas. On these grounds vaccination with animal lymph should in future take the place of vaccination with humanized lymph.—*Commission zur Erorterung der Impffrage. Denkschrift über die Northwendigkeit der allgemeinen Einführung der Impfung mit Thierlymphe.*

The report just issued of the medical officer of the Local Government Board (*Fourteenth Annual Report of the Local Government Board,* 1884–85. *Supplement containing the Report of the Medical Officer for* 1884) gives important evidence on these points:

1. As to risk from use of humanized lymph, DR. BUCHANAN says, "I wish you again to note the extent of the danger that accompanies vaccination under the circumstances of English vaccination practice. There is little that man, woman, or child has to do, or to have done for them, that does not contain an element of danger; but reasonable people, while endeavoring to remove all preventable risk, do not regard this risk as a reason for not doing what is proper to be done. For example, I find from the last published annual report of the Registrar General that 974 children under one year old were suffocated in a twelvemonth by bedclothes; the fact gives a reason for care in the use of bedclothes, but gives no reason for going without them. So, 55 deaths (51 being of infants under one year) were recorded in that report as from vaccination and the results of vaccination; they doubtless were, for the most part, cases of erysipelas, and their occurrence gives reason for cleanliness of lancets, for avoidance of filthy 'vaccination shields,' and generally for care in vaccination; but it assuredly gives no reason for going without vaccination. When we learn from the same report that 5 infants died in the same year from 'circumcision,' the dimensions of the danger implied in the 55 deaths by 'vaccination' may be understood. As for any remoter injury to the health of the community, attributable to vaccination as practised in England, I can find no evidence of it, statistical or other.

"As a matter of English practice, with all the opportunities for knowledge that come to me, and with an eagerness of search after facts, I cannot learn of communication of syphilis in vaccination being actually effected once in a million of vaccinations.

"I do not think it necessary to speak at length of *tubercular* diseases of children. The small increase of deaths registered as 'tabes mesenterica' has been balanced by a decrease in the deaths of children under five registered as from 'phthisis,' the death-rate from the two together having kept very closely uniform, and the changes in registered mortality of the one and the other being obviously a question of which of certain synonyms is used in medical certificates."

2. As to relative success with animal and humanized lymph.

"In England, these are identical when the operation is done directly from arm to arm, or calf to arm; thus, two operators at the Animal Vaccine Establishment, in London, produced an average of 988 vesicles for every thousand insertions of calf lymph made on infants. Now the employment of stored lymph reduces this average by some 20 or 30 per cent., whether humanized or animal lymph be used. Direct vaccination from calf to arm is only possible in large centres of population; in sparsely inhabited districts the use of stored lymph becomes a practical necessity, unless arm to arm vaccination be resorted to; hence, there is much probability that the decision of the German

Commission will tend to reduce the condition of the German people, as to protection against smallpox, to the condition of the inhabitants of the Grand Duchy of Hesse."

The Kingdom of Saxony has made arrangements for the immediate replacement of her present system by the institution of four animal-vaccine stations, the lymph from which will be supplied gratis to public vaccinators, and at a cost of fifty pfennige for each tube to private practitioners.[1]

How far the compulsory revaccination law of 1874 in Germany, which requires the revaccination of children at twelve years of age, and which it is proposed now to apply to children of ten years of age, may reduce the injury which has already been experienced in Hesse, time alone can show. The beneficial effect of this law is well indicated by a comparison of the death-rates from smallpox since 1874 in Berlin, Hamburg, Breslau, Munich, and Dresden, with those in London, Paris, Vienna, and St. Petersburg. The extraordinary comparative disappearance of the disease from the German cities contrasts in a marked degree with the prevalence of the disease in the other cities mentioned. Or, again, the relative conduct of the disease in Prussia, where its comparative absence is emphasized by the prevalence of smallpox in Austria, where this law does not exist, is not more remarkable than the difference of liability to smallpox of the armies of the two countries.

HYDROPHOBIA.

M. **PASTEUR** has recently read before the Academy of Medicine in Paris a paper on a method for preventing hydrophobia after the bite.

The method consists in the preparation of a virus which can be inoculated into the subject bitten, and which can be cultivated so as to possess different degrees of virulence. The weakest strength is first injected beneath the skin of the subject operated on, and every forty-eight hours a stronger virus is injected until the most virulent fluid is reached. This is done during the incubative period, and as soon after the bite as possible, so that before the opportunity is given to the virus of the bite to produce its effects, immunity is afforded the subject.

M. Pasteur found that when a portion of the spinal cord of a dog which had died of rabies was injected beneath the dura mater of a rabbit, this animal was infected with the same disease at the end of fifteen days. The spinal cord of the rabbit contains the virus of rabies equally distributed throughout its length. A portion of the spinal cord, after removal with antiseptic precautions, is placed in a bottle containing caustic potash to keep the air dry, and it is found that the virulence gradually disappears at a rate proportionate to the lowness of the temperature. Thus, spinal cords are used which have been kept different periods of time, and a bouillon prepared from each which can be injected. M. Pasteur's experiments were necessarily confined, in the first instance, to the lower animals, and the two or three persons who, after exposure to the bites of rabid dogs, have since been successfully inoculated by him, cannot as yet be regarded as affording sufficient evidence of the value of the treatment.

Nevertheless, there is reason for hoping that a more extended experience will not lead to any less satisfactory results than those already obtained.

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[1] Deutsche medicinische Wochenschrift; Elfter Jahrgang, No. 32.